

1 0 2 0 Rec'd PCT/PTO 1 1 MAR 2002
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
REQUEST FOR FILING NATIONAL PHASE OF
PCT APPLICATION UNDER 35 U.S.C. 371 AND 37 CFR 1.494 OR 1.495

10/070720

To: Hon. Commissioner of Patents
Washington, D.C. 20231



00909

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)

Atty Dkt: P 290739 /110011206US
M# /Client Ref.

From: Pillsbury Winthrop LLP, IP Group:

Date: March 11, 2002

This is a **REQUEST** for **FILING** a PCT/USA National Phase Application based on:

1. International Application PCT/SE00/01754 ↑ country code	2. International Filing Date 8 September 2000 Day MONTH Year	3. Earliest Priority Date Claimed 10 September 1999 Day MONTH Year (use item 2 if no earlier priority)
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4. Measured from the earliest priority date in item 3, this PCT/USA National Phase Application Request is being filed within:

(a) ☐ 20 months from above item 3 date (b) ☒ 30 months from above item 3 date,

(c) Therefore, the due date (unextendable) is March 10, 2002

5. Title of Invention METHOD AND DEVICE FOR INTERLOCKING

6. Inventor(s) Hans LINDER and Ulf BORG

Applicant herewith submits the following under 35 U.S.C. 371 to effect filing:

☒ Please immediately start national examination procedures (35 U.S.C. 371 (f)).

8. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2)) is transmitted herewith (file if in English but, if in foreign language, file only if not transmitted to PTO by the International Bureau) including:

- a. ☒ Request;
b. ☒ Abstract;
c. 6 pgs. Spec. and Claims;
d. 6 sheet(s) Drawing which are ☐ informal ☒ formal of size ☒ A4 ☐ 11"

9. ☒ A copy of the International Application has been transmitted by the International Bureau.

10. A translation of the International Application into English (35 U.S.C. 371(c)(2))

- a. ☐ is transmitted herewith including: (1) ☐ Request; (2) ☐ Abstract;
(3) _____ pgs. Spec. and Claims;
(4) _____ sheet(s) Drawing which are:
☐ informal ☐ formal of size ☐ A4 ☐ 11"
- b. ☐ is not required, as the application was filed in English.
c. ☐ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
d. ☐ Translation verification attached (not required now).

11. ☒ Please see the attached Preliminary Amendment
12. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., **before 18th month from first priority date above in item 3, are transmitted herewith (file only if in English) including:**
13. ☒ PCT Article 19 claim amendments (if any) have been transmitted by the International Bureau
14. ☐ Translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)), i.e., of **claim amendments** made before 18th month, **is attached (required by 20th month from the date in item 3 if box 4(a) above is X'd, or 30th month if box 4(b) is X'd, or else amendments will be considered canceled).**
15. **A declaration of the inventor** (35 U.S.C. 371(c)(4))
a. ☐ is submitted herewith ☐ Original ☐ Facsimile/Copy
b. ☒ is not herewith, but will be filed when required by the forthcoming PTO Missing Requirements Notice per Rule 494(c) if box 4(a) is X'd or Rule 495(c) if box 4(b) is X'd.
16. **An International Search Report (ISR):**
a. Was prepared by ☐ European Patent Office ☐ Japanese Patent Office ☒ Other
b. ☒ has been transmitted by the international Bureau to PTO.
c. ☒ copy herewith (3 pg(s).) ☒ plus Annex of family members (1 pg(s).).
17. **International Preliminary Examination Report (IPER):**
a. ☒ has been transmitted (if this letter is filed after 28 months from date in item 3) in English by the International Bureau with Annexes (if any) in original language.
b. ☒ copy herewith in English.
c.1 ☐ IPER Annex(es) in original language ("Annexes" are amendments made to claims/spec/drawings during Examination) including attached amended:
c.2 ☐ Specification/claim pages #__ claims #
Dwg Sheets #
d. ☐ Translation of Annex(es) to IPER **(required by 30th month due date, or else annexed amendments will be considered canceled).**
18. **Information Disclosure Statement** including:
a. ☒ Attached Form PTO-1449 listing documents
b. ☒ Attached copies of documents listed on Form PTO-1449
c. ☒ A concise explanation of relevance of ISR references is given in the ISR.
19. ☐ **Assignment** document and Cover Sheet for recording are attached. Please mail the recorded assignment document back to the person whose signature, name and address appear at the end of this letter.
20. ☐ Copy of Power to IA agent.
21. ☒ **Drawings** (complete only if 8d or 10a(4) not completed): 6 sheet(s) per set: ☐ 1 set informal; ☒ Formal of size ☒ A4 ☐ 11"
22. Small Entity Status ☒ is **Not** claimed ☐ is claimed (pre-filing confirmation required)
22(a) ___ (No.) Small Entity Statement(s) enclosed (since 9/8/00 Small Entity Statements(s) not essential to make claim)
23. **Priority** is hereby claimed under 35 U.S.C. 119/365 based on the priority claim and the certified copy, both filed in the International Application during the international stage based on the filing in (country) SWEDEN of:
- | | Application No. | Filing Date | | Application No. | Filing Date |
|-----|-----------------|--------------------|-----|-----------------|-------------|
| (1) | 9903246-8 | September 10, 1999 | (2) | | |
| (3) | | | (4) | | |
| (5) | | | (6) | | |
- a. ☒ See Form PCT/IB/304 sent to US/DO with copy of priority documents. If copy has not been received, please proceed promptly to obtain same from the IB.
- b. ☐ Copy of Form PCT/IB/304 attached.

10/070720

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24. Attached: PCT/IPEA/408 - PCT Written Opinion
Reply to Written Opinion25 Per Item 17.c2, **cancel original** pages #__, claims #__, Drawing Sheets #26. **Calculation of the U.S. National Fee (35 U.S.C. 371 (c)(1)) and other fees is as follows:**Based on amended claim(s) per above item(s) ☐ 12, ☐ 14, ☐ 17, ☐ 25 (hilit)

Total Effective Claims	16	minus 20 =	0	x \$18/\$9	=	\$0	966/967
Independent Claims	2	minus 3 =	0	x \$84/\$42	=	\$0	964/965
If any proper (ignore improper) Multiple Dependent claim is present,				add \$280/\$140	+	0	968/969

BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(4)): →→ BASIC FEE REQUIRED, NOW →→→→

A. If country code letters in item 1 are not "US", "BR", "BB", "TT", "MX", "IL", "NZ", "IN" or "ZA"

See item 16 re:

1. Search Report was <u>not</u> prepared by EPO or JPO -----	add \$1,040/\$52		960/961
	0		
2. Search Report was prepared by EPO or JPO -----	add \$890/\$445	+1040	970/971

SKIP B, C, D AND E UNLESS country code letters in item 1 are "US", "BR", "BB", "TT", "MX", "IL", "NZ", "IN", "ZA", "LC" or "PH"

→ <input type="checkbox"/> B. If <u>USPTO</u> did not issue <u>both</u> International Search Report (ISR) and (if box 4(b) above is X'd) the International Examination Report (IPER), -----	add \$1,040/\$52	+0	960/961
(X)	0		
(only) → <input type="checkbox"/> C. If <u>USPTO</u> issued ISR but not IPER (or box 4(a) above is X'd), -----	add \$740/\$370	+0	958/959
(one) →			
(of)			
(these) → <input type="checkbox"/> D. If <u>USPTO</u> issued IPER but IPER Sec. V boxes <u>not all</u> 3 YES, -----	add \$710/\$355	+0	956/957
(4) →			
(boxes)			
→ <input type="checkbox"/> E. If international preliminary examination fee was paid to <u>USPTO</u> and Rules 492(a)(4) and 496(b) <u>satisfied</u> (in IPER Sec. V <u>all</u> 3 boxes <u>must</u> be YES for <u>all</u> claims), --	add \$100/\$50	+0	962/963

27. SUBTOTAL = \$1040

28. If Assignment box 19 above is X'd, add Assignment Recording fee of ----\$40 +0 (581)

29. If box 15a is x'd, determine whether inventorship on Declaration is different than in international stage. If yes, add (per Rule 497(d)) ----\$130 +0 (098)

30. Attached is a check to cover the ----- TOTAL FEES \$1040

Our Deposit Account No. 03-3975

Our Order No. 070051 | 0290739
C# M#

00909

CHARGE STATEMENT: The Commissioner is hereby authorized to charge any fee specifically authorized hereafter, or any missing or insufficient fee(s) filed, or asserted to be filed, or which should have been filed herewith or concerning any paper filed hereafter, and which may be required under Rules 16-18 and 492 (missing or insufficient fee only) now or hereafter relative to this application and the resulting Official document under Rule 20, or credit any overpayment, to our Account/Order Nos. shown above for which purpose a duplicate copy of this sheet is attached.

This CHARGE STATEMENT does not authorize charge of the issue fee until/unless an issue fee transmittal form is filedPillsbury Winthrop LLP
Intellectual Property Group

By Atty: Paul T. Bowen

Reg. No. 38009

Sig:

Fax: (703) 905-2500
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Atty/Sec: PTB/jck

NOTE: File in duplicate with 2 postcard receipts (PAT-103) & attachments.

JC10 Rec'd PCT/PTO 11 MAR 2002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PATENT APPLICATION OF

Inventor(s): LINDER et al.

Filed: March 11, 2002

Title: METHOD AND DEVICE FOR INTERLOCKING

March 11, 2002

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents
Washington, D.C. 20231

Sir:

Please amend this application as follows:

IN THE SPECIFICATION:

At the top of the first page, just under the title, insert

☒ --This application is the National Phase of International Application
PCT/SE00/01754 filed September 8, 2000 which designated the U.S.
and that International Application

☒ was ☐ was not published under PCT Article 21(2) in English.--

See the attached Appendix for the changes made to effect the above paragraph.

IN THE CLAIMS:

Please amend claims 1-15, as follows:

1. (Amended) Method for interlocking a breaker for a single-pole or multiple-pole mechanical switching device that includes a link system for coupling of the poles, wherein the actuator of the breaker is interlocked both electrically and mechanically, whereby the

electrical and mechanical interlocking is indicated both electrically and mechanically by means of respective indicators.

2. (Amended) Method according to claim 1, wherein the electrical and mechanical interlocking of the actuator of the breaker is achieved by means of a hand-operated key- and lock device.

3. (Amended) Method according to claim 2, wherein the operation of the key- and lock device releases an electromagnetic blocking unit that interlocks a locking package on the actuator of the breaker.

4. (Amended) Method according to claim 2, wherein the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the open position, whereby the distance between the contacts comprises the conductor spacing for the disconnecting.

5. (Amended) Method according to claim 2, wherein the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the closed position, whereby the hand-operated key- and lock device achieves an automatic change of the breaker from the closed to the open position, whereby the distance between the contacts constitutes the conductor spacing for the isolation function.

6. (Amended) Method according to claim 4, wherein the key device is freed from the lock device following the interlocking of the actuator of the breaker and is used in a second lock device for mechanical interlocking of the link system with the aid of a blocking device, which interlocking is locked by a second key device with a third lock device.

7. (Amended) Method according to claim 6, wherein the interlocking of the link system is indicated by at least one indicator.

8. (Amended) Method according to claim 6, wherein the second key device is used with a fourth lock device for mechanical unlocking of the actuator for an earth knife or equivalent earth device, which fourth lock device, after connection of the earth knife to the breaker, is locked with the second key device and the fourth lock device.

9. (Amended) Method according to claim 2, wherein the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the closed

position, whereby the key device is blocked into the lock device following the interlocking of the actuator of the breaker.

10. (Amended) Method according to claim 1, wherein the electrical and mechanical interlocking of the actuator of the breaker is achieved by means of a remotely controlled interlocking device.

11. (Amended) Method according to claim 10, wherein the remotely controlled interlocking of the actuator of the breaker is indicated by electrical and mechanical indicators on the actuator and by indicators on the remote-control unit.

12. (Amended) Method according to claim 10, wherein the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the open position, whereby the distance between the contacts comprises the conductor spacing for the disconnecting function.

13. (Amended) Method according to claim 12, wherein the interlocking device includes mechanical movement of a blocking device for an earth knife, after which movement of the earth knife involves interlocking of the link system.

14. (Amended) Method according to claim 13, wherein the interlocking of the link system is indicated by at least one indicator.

15. (Amended) Device for interlocking of a breaker for a single-poled or multiple-poled mechanical switching device that includes link systems for connection of the poles, including blocking units for interlocking of the actuator of the breaker wherein it includes an electromagnet that on release interlocks a locking package in the actuator of the breaker both electrically and mechanically, whereby the electrical and mechanical interlocking is indicated both electrically and mechanically by means of the relevant indicators.

Please add new claim 16, as follows:

16. (New) Method according to claim 5, wherein the key device is freed from the lock device following the interlocking of the actuator of the breaker and is used in a second lock device for mechanical interlocking of the link system with the aid of a blocking device, which interlocking is locked by a second key device with a third lock device.

See the attached Appendix for the changes made to effect the above claims.

LEONARD B. COHEN

• **•**

markings to show changes made".

Prompt and favorable consideration is respectfully requested.

Respectfully submitted,

PILLSBURY WINTHROP LLP
Intellectual Property Group

Paul H.

Attorney: Paul T. Bowen

Reg. No: 38,009

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PTB/jck
Enclosure:
Appendix

1600 Tysons Boulevard
McLean, VA 22102
(703) 905-2000

APPENDIXVERSION WITH MARKINGS TO SHOW CHANGES MADEIN THE SPECIFICATION:

At the top of the first page, just under the title, insert

☒ This application is the National Phase of International Application PCT/SE00/01754 filed September 8, 2000 which designated the U.S. and that International Application ☒ was ☐ was not published under PCT Article 21(2) in English.

IN THE CLAIMS:

Please amend claims 1-15, as follows:

1. (Amended) Method for interlocking a breaker for a single-pole or multiple-pole mechanical switching device that includes a link system for coupling of the poles, [characterised in that] wherein the actuator of the breaker is interlocked both electrically and mechanically, whereby the electrical and mechanical interlocking is indicated both electrically and mechanically by means of respective indicators.

2. (Amended) Method according to claim 1, [characterised in that] wherein the electrical and mechanical interlocking of the actuator of the breaker is achieved by means of a hand-operated key- and lock device.

3. (Amended) Method according to claim 2, [characterised in that] wherein the operation of the key- and lock device releases an electromagnetic blocking unit that interlocks a locking package on the actuator of the breaker.

4. (Amended) Method according to claim 2, [characterised in that] wherein the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the open position, whereby the distance between the contacts comprises the conductor spacing for the disconnecting.

5. (Amended) Method according to claim 2, [characterised in that] wherein the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the closed position, whereby the hand-operated key- and lock device achieves an automatic change of the breaker from the closed to the open position, whereby the distance between the contacts constitutes the conductor spacing for the isolation function.

6. (Amended) Method according to [either of] claim 4 [or 5, characterised in that] , wherein the key device is freed from the lock device following the interlocking of the actuator of the breaker and is used in a second lock device for mechanical interlocking of the link system with the aid of a blocking device, which interlocking is locked by a second key device with a third lock device.

7. (Amended) Method according to claim 6, [characterised in that] wherein the interlocking of the link system is indicated by at least one indicator.

8. (Amended) Method according to claim 6, [characterised in that] wherein the second key device is used with a fourth lock device for mechanical unlocking of the actuator for an earth knife or equivalent earth device, which fourth lock device, after connection of the earth knife to the breaker, is locked with the second key device and the fourth lock device.

9. (Amended) Method according to claim 2, [characterised in that] wherein the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the closed position, whereby the key device is blocked into the lock device following the interlocking of the actuator of the breaker.

10. (Amended) Method according to claim 1, [characterised in that] wherein the electrical and mechanical interlocking of the actuator of the breaker is achieved by means of a remotely controlled interlocking device.

11. (Amended) Method according to claim 10, [characterised in that] wherein the remotely controlled interlocking of the actuator of the breaker is indicated by electrical and mechanical indicators on the actuator and by indicators on the remote-control unit.

12. (Amended) Method according to claim 10, [characterised in that] wherein the electrical and mechanical interlocking of the actuator of the breaker is carried out with the

breaker in the open position, whereby the distance between the contacts comprises the conductor spacing for the disconnecting function.

13. (Amended) Method according to claim 12, [characterised in that] wherein the interlocking device includes mechanical movement of a blocking device for an earth knife, after which movement of the earth knife involves interlocking of the link system.

14. (Amended) Method according to claim 13, [characterised in that] wherein the interlocking of the link system is indicated by at least one indicator.

15. (Amended) Device for interlocking of a breaker for a single-poled or multiple-poled mechanical switching device that includes link systems for connection of the poles, including blocking units for interlocking of the actuator of the breaker [characterised in that] wherein it includes an electromagnet that on release interlocks a locking package in the actuator of the breaker both electrically and mechanically, whereby the electrical and mechanical interlocking is indicated both electrically and mechanically by means of the relevant indicators.

New claim 16 is added.

APPLICATION UNDER UNITED STATES PATENT LAWS

Atty. Dkt. No. PW 290739
(M#)

Invention: METHOD AND DEVICE FOR INTERLOCKING

Inventor (s): Hans LINDER
Ulf BORG



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Pillsbury Winthrop LLP

This is a:

- ☐ Provisional Application
- ☐ Regular Utility Application
- ☐ Continuing Application
 - ☒ The contents of the parent are incorporated by reference
- ☒ PCT National Phase Application
- ☐ Design Application
- ☐ Reissue Application
- ☐ Plant Application
- ☐ Substitute Specification
 - Sub. Spec Filed _____
 - in App. No. _____ / _____
- ☐ Marked up Specification re
 - Sub. Spec. filed _____
 - In App. No _____ / _____

SPECIFICATION

PTO/PCT REC'G 11 MAR 2002

METHOD AND DEVICE FOR INTERLOCKING

Technical field

The present invention concerns a method and a device for interlocking a disconnecting breaker.

The prior art

Safety regulations have earlier required a disconnecter with a visually open conductor spacing during work on, for example, a high tension switch gear. According to the traditional solution, a breaker and a disconnecter have together ensured that the section of the equipment where the work is to be carried out is disconnected. This type of solution requires at least one, and often two, disconnectors with demanding maintenance in order to ensure their correct function. Each disconnector must be correctly installed with a foundation that requires space and expensive installation time. The present invention is intended to solve the problems described above. The intention is to provide a compact solution, reliable from the point of view of safety, that is simple to manufacture and cost-effective for the customer. The construction permits manufacture of the parts according to known technology.

Summary of the invention

The present invention concerns a method and a device for interlocking a disconnecting breaker. The earlier requirement for a visually open disconnector has been replaced according to new regulations by the requirement for a reliable indication that the section of the equipment is disconnected.

During interlocking of a single- or multiple-poled disconnecting breaker that includes a linkage system, known as a "rod system", for closing operation and opening of the contacts of the breaker, the actuator of the breaker is first interlocked both electrically and mechanically. When the breaker is in the open position, the distance between the contacts of the breaker constitutes the conductor spacing of the disconnecting function. The electrical and mechanical interlocking of the actuator is indicated both electrically and mechanically.

The interlocking of the actuator of the breaker is achieved with the aid of an electromagnetic blocking unit that can be operated with a hand-operated key- and lock device. The blocking unit can in one preferred embodiment be operated by remote control. In one preferred embodiment, operation of the hand-operated key- and lock device controls an electromagnet that interlocks a locking package of the actuator of the breaker both by

breaking the operating current to the locking package and by mechanically blocking the locking package. The key device is freed from the lock device following the interlocking of the actuator of the breaker and is used in a second lock device for mechanical interlocking of the rod system with the aid of a blocking unit. The rod system is locked in the interlocked condition with a second key device and a third lock device. The interlocking of the rod system is indicated by at least one indicator.

According to one embodiment of the device, the second key device is used with a fourth lock device in order to free a blocking unit, which makes it possible to move an earth knife or other earth device. Once the earth knife has been connected to the breaker, the earth knife is blocked in its connected position and locked with the second key device and the fourth lock device.

The electrical and mechanical interlocking of the actuator of the breaker can in one preferred embodiment be achieved with a remote-controlled interlocking device. The remote-controlled interlocking of the actuator of the breaker is indicated by electrical and mechanical indicators on the breaker and by indicators on the remote-control unit. The remote-controlled interlocking device includes the operation of a blocking device for the earth knife, after which movement of the earth knife is accompanied by interlocking of the rod system. The system according to the invention is very reliable from the point of view of safety due to the interlocking in one preferred embodiment being performed by the exchange of keys, and due to electrical and mechanical indicators showing in different ways that the breaker is interlocked.

Brief description of the figures

Fig. 1 shows a sketch of the principle of a disconnecting breaker for a three-phase system.

Fig. 2 shows a sketch of the principle of a disconnecting breaker for a single-phase system.

Fig. 3 shows an actuator for operation of breakers.

Fig. 4 shows interlocking of the rod system with a blocking plate and lock.

Fig. 5 shows an actuator for an earth knife together with interlocking of the earth knife with a blocking unit equipped with a lock.

Fig. 6 shows interlocking of the rod system during remote control.

Detailed description of preferred embodiments

Fig. 1 shows a sketch of the principle of a disconnecting breaker for three poles. An

actuator 10 controls a link system, known as a rod system, 20 which connects the poles together and controls the positions of the contacts 30 of the breaker. The positions of the contacts 30 of the breaker are indicated on each pole, for example with a mechanical arrow 70. An earth knife 40 is controlled by its own actuator 50, which is in direct electrical connection with the actuator 10 through a cable 60 connected between the actuators. When the disconnecting breaker is interlocked, the actuator 10 is first interlocked both electrically and mechanically with the aid of an electromagnet 12. After this, the rod system 20 of the breaker 30 is interlocked mechanically. The indication is achieved in one preferred embodiment electrically with a lamp and mechanically with, for example, an arrow. The key- and lock device in one preferred embodiment is a Castel lock with the associated keys. When both the actuator 10 and the rod system 20 are interlocked, manual operation and locking of the earth knife 40 according to known technology are possible.

Fig. 2 shows a sketch of the principle of an disconnectingbreaker for a single pole. An actuator 10 controls a link system, also known as a rod system, 20 which controls the position of the contacts 30 of the breaker. The positions of the contacts 30 of the breaker are indicated, for example, with a mechanical arrow 70. An earth knife 40 is controlled by its own actuator 50, which is in direct electrical connection with the actuator 10 through a cable 60 connected between the actuators. When the single-pole disconnectingbreaker is interlocked, the breaker is interlocked according to the same principle as the three-pole disconnectingbreaker.

Fig. 3 shows the actuator 10 for control of the rod system 20 and thus the position of the contacts 30, which includes a locking package 11 that controls the position of the breaker 30 together with an electromagnet 12 equipped with a mechanical locking shackle 13 or equivalent device. When a first key 18 is turned in the lock 14, the electromagnet 12 releases, whereby operating current to the locking package 11, which is used for control of the rod system and thus the breaker, is interrupted. Under the condition that the breaker is in the OFF position, a shackle 13 is released downwards and mechanically blocks movement of the locking package from the OFF position to the ON position. Indication that interlocking of the actuator is achieved, for example, by the lighting of a green lamp on the external surface of the actuator and by the pointing towards a green field of a mechanical arrow 16 inside the actuator. An auxiliary contact 17 indicates the position of the breaker. When the breaker is OFF and the actuator is interlocked, a signal is sent from the auxiliary contact 17 via the cable 60 to the actuator 50 of the earth knife. This is one of

the conditions that must be satisfied if movement of the earth knife is to be possible. If the breaker is in the ON position when the actuator is interlocked, the breaker can in one preferred embodiment be automatically breakered over to the OFF position. In one preferred embodiment the actuator of the breaker can be interlocked with the breaker in the ON position. The indicator 70 then indicates that the breaker is in the ON position. Movement of the earth knife is not possible in this condition since this requires a signal from the auxiliary contact 17 *via* the cable 60 to the actuator of the earth knife.

Fig. 4 shows part of a link system, known as a rod system, 20 for operation of the contacts 30 of the breaker. The rod system 20 is equipped with a moving part 21 that is in an inner position when the breaker is ON and an outer, visible position when the breaker is OFF. By turning the first key 18 in a second lock 22, manual movement of a blocking plate 23, or other blockage device, is made possible. The blockage plate 23 is pushed in a sideways direction and locked in place with a second key 24 in a third lock 25 such that the moving part 21 and thus the rod system 20 are locked into their outer positions. The interlocking of the rod system can be indicated with, for example, an arrow.

Fig. 5 shows the earth knife 40 with its actuator 50. The position of the earth knife is controlled by a link system 51.

Fig. 6 shows the design of the rod system when remote-controlled interlocking is used. Movement of the earth knife involves movement of the blocking plate 23 *via* a rotatable disk 80.

1. Method for interlocking a breaker for a single-pole or multiple-pole mechanical switching device that includes a link system for coupling of the poles,

2. Method according to claim 1, c h a r a c t e r i s e d in that the electrical and mechanical interlocking of the actuator of the breaker is achieved by means of a hand-operated key- and lock device.

4. Method according to claim 2, c h a r a c t e r i s e d in that the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the open position, whereby the distance between the contacts comprises the conductor spacing for the disconnecting.

5. Method according to claim 2, c h a r a c t e r i s e d in that the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the closed position, whereby the hand-operated key- and lock device achieves an automatic change of the breaker from the closed to the open position, whereby the distance between the contacts constitutes the conductor spacing for the isolation function.

6. Method according to either of claim 4 or 5, c h a r a c t e r i s e d in that the key device is freed from the lock device following the interlocking of the actuator of the breaker and is used in a second lock device for mechanical interlocking of the link system with the aid of a blocking device, which interlocking is locked by a second key device with a third lock device.

7. Method according to claim 6, c h a r a c t e r i s e d in that the interlocking of the link system is indicated by at least one indicator.

8. Method according to claim 6, c h a r a c t e r i s e d in that the second key device is used with a fourth lock device for mechanical unlocking of the actuator for an earth knife or equivalent earth device, which fourth lock device, after connection of the earth knife to the breaker, is locked with the second key device and the fourth lock device.

9. Method according to claim 2, c h a r a c t e r i s e d in that the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the closed position, whereby the key device is blocked into the lock device following the interlocking of the actuator of the breaker.

5 10. Method according to claim 1, c h a r a c t e r i s e d in that the electrical and mechanical interlocking of the actuator of the breaker is achieved by means of a remotely controlled interlocking device.

11. Method according to claim 10, c h a r a c t e r i s e d in that the remotely controlled interlocking of the actuator of the breaker is indicated by electrical and
10 mechanical indicators on the actuator and by indicators on the remote-control unit.

12. Method according to claim 10, c h a r a c t e r i s e d in that the electrical and mechanical interlocking of the actuator of the breaker is carried out with the breaker in the open position, whereby the distance between the contacts comprises the conductor spacing for the disconnecting function.

15 13. Method according to claim 12, c h a r a c t e r i s e d in that the interlocking device includes mechanical movement of a blocking device for an earth knife, after which movement of the earth knife involves interlocking of the link system.

14. Method according to claim 13, c h a r a c t e r i s e d in that the interlocking of the link system is indicated by at least one indicator.

15. Device for interlocking of a breaker for a single-poled or multiple-poled mechanical switching device that includes link systems for connection of the poles, including blocking units for interlocking of the actuator of the breaker characterised in that it includes an electromagnet that on release interlocks a locking package in the actuator of the breaker both electrically and mechanically, whereby the electrical and mechanical interlocking is indicated both electrically and mechanically by means of the relevant indicators.

■■■■■

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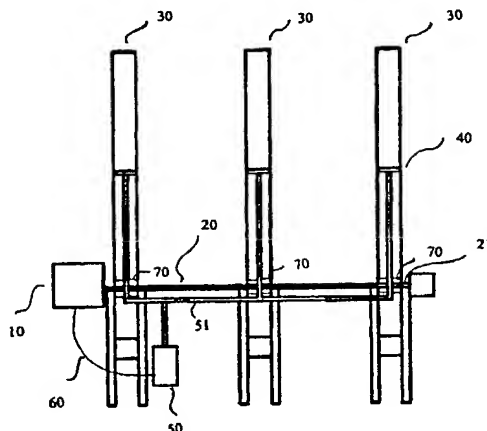
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(54) Title: METHOD AND DEVICE FOR INTERLOCKING



(57) Abstract: The present invention concerns a method and a device for interlocking a disconnecting breaker. During interlock-
ing of a single-poled or multiple-poled disconnecting breaker, the actuator of the breaker is first interlocked both electrically and
mechanically. When the breaker is in the open position, the distance between the contacts of the breaker comprises the conductor
spacing for the isolation function. The electrical and mechanical interlocking of the actuator is indicated both electrically and me-
chanically. Subsequently, the link system of the breaker is mechanically interlocked. The link system is locked in the interlocked
position. Interlocking of the link system is indicated by at least one indicator. Interlocking of the actuator of the breaker can be
controlled manually via a key- and lock device, or remotely.

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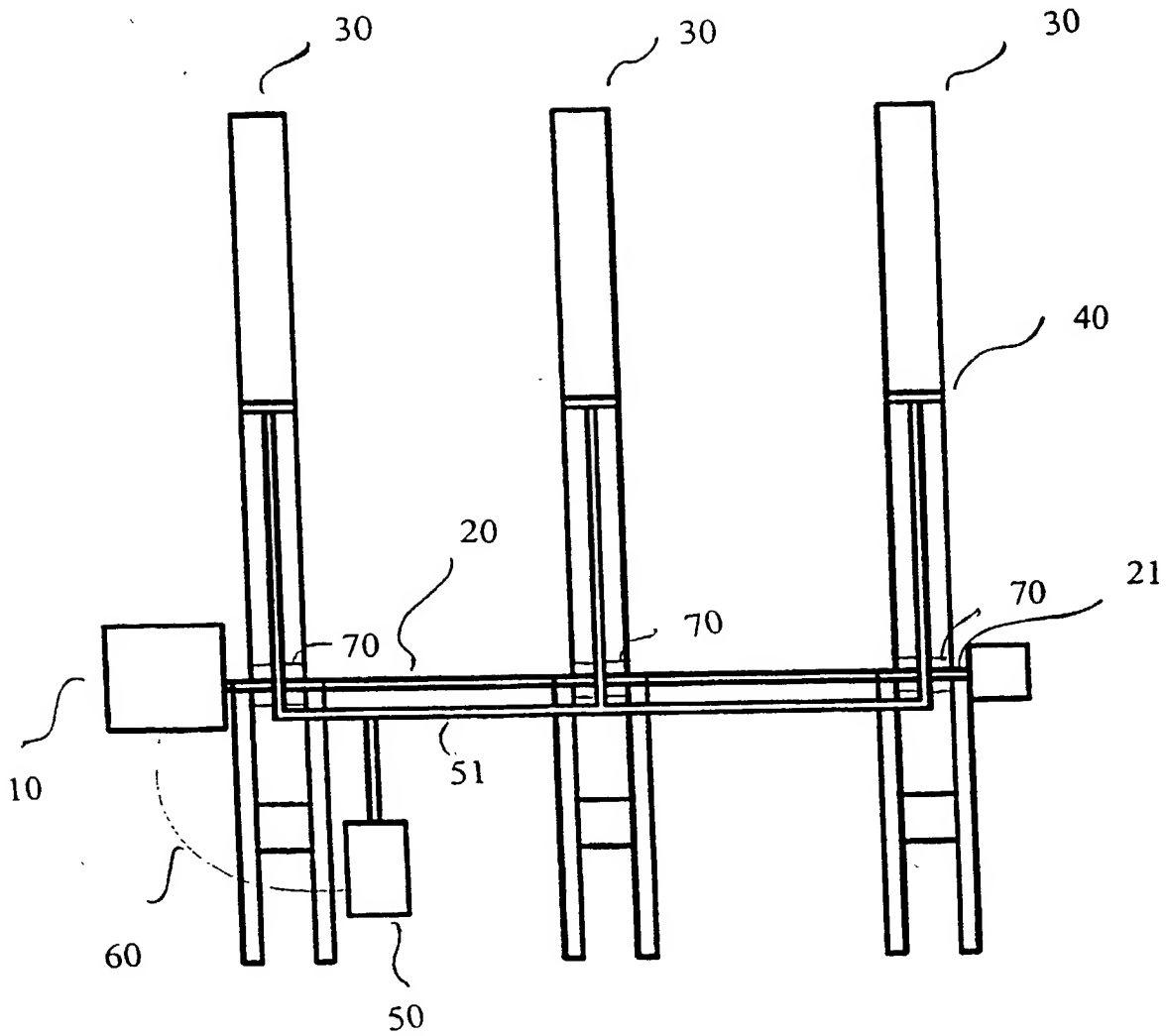


Fig. 1

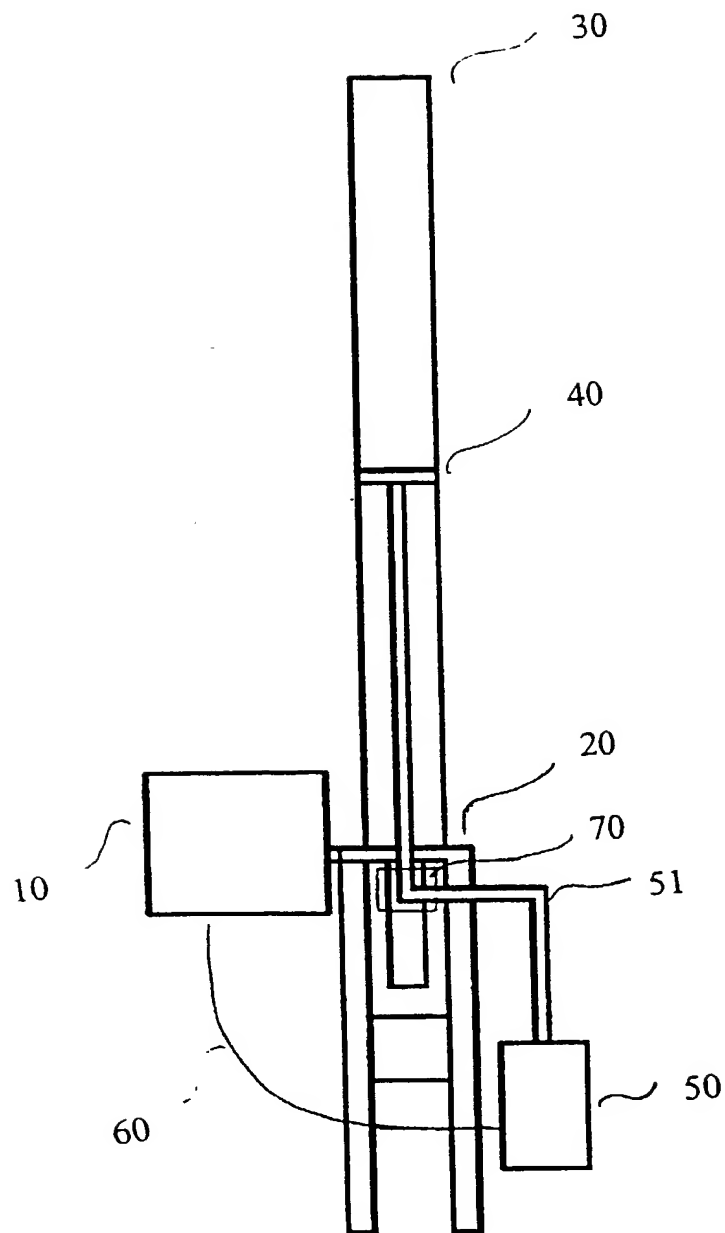


Fig. 2

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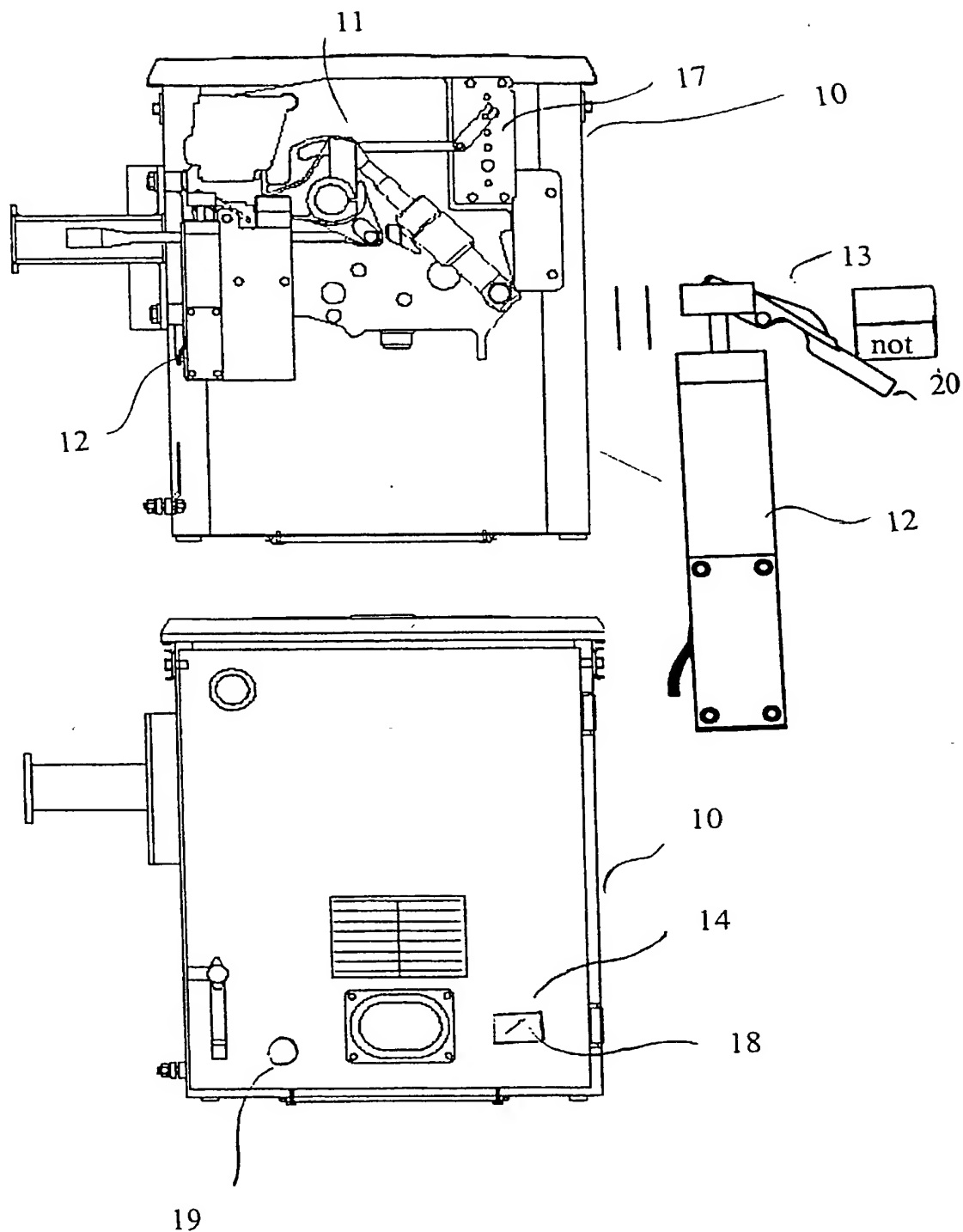


Fig. 3

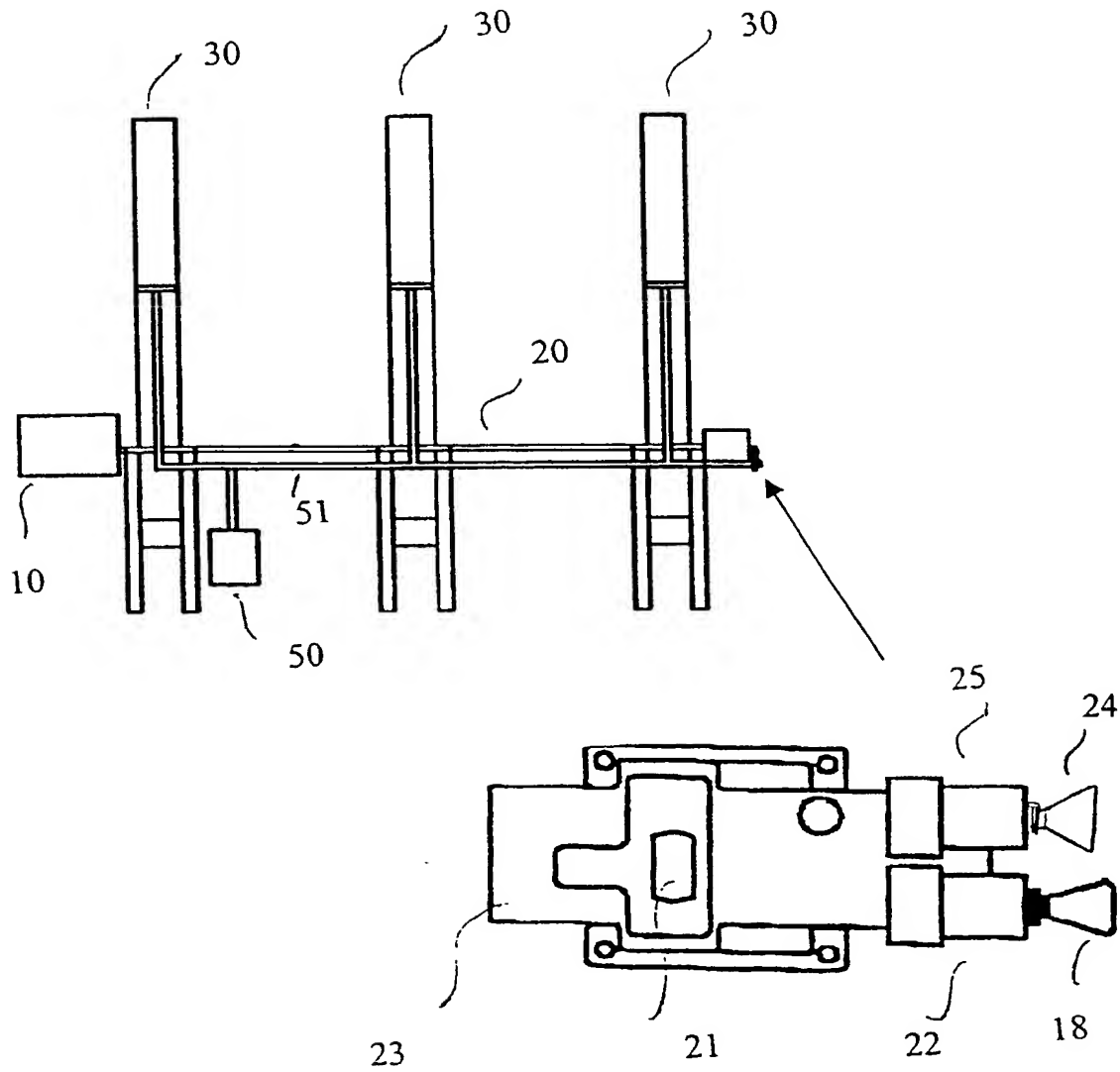


Fig. 4

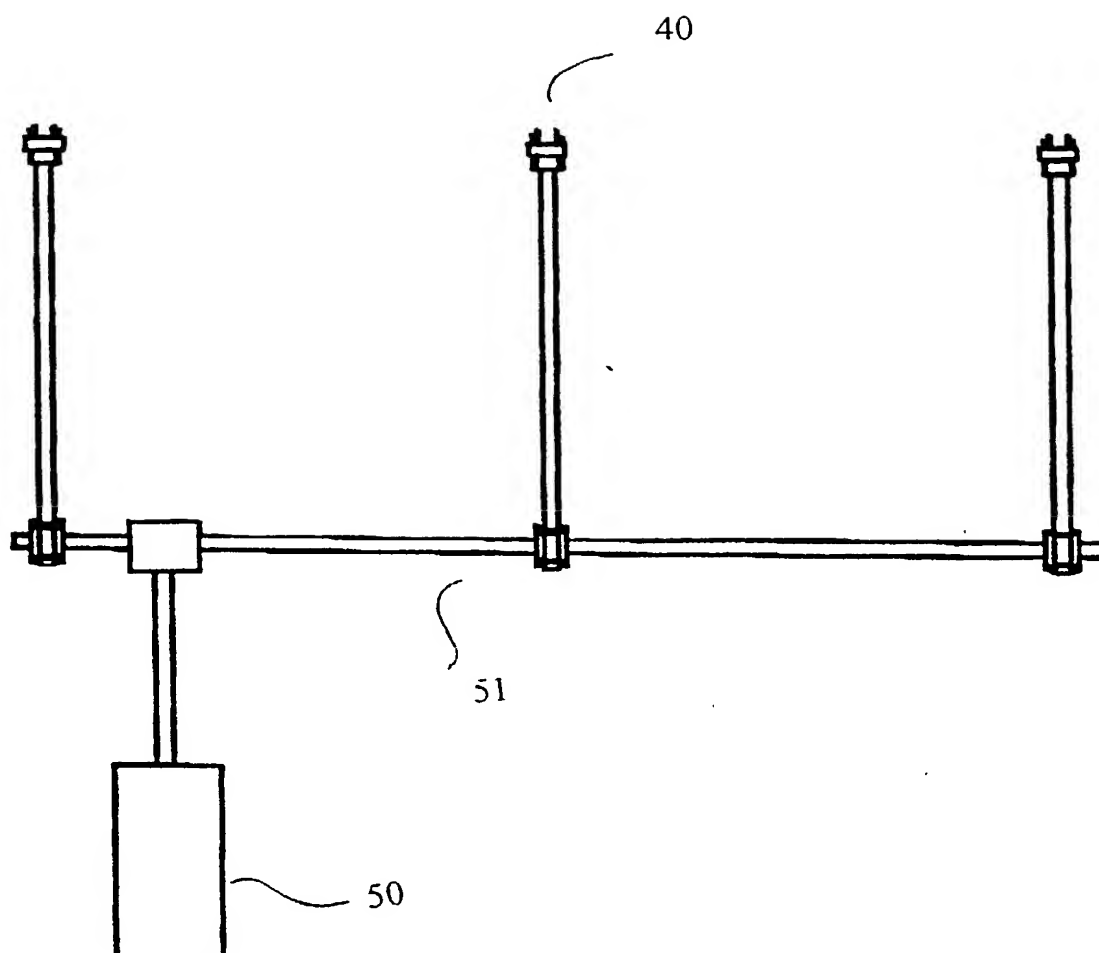


Fig. 5

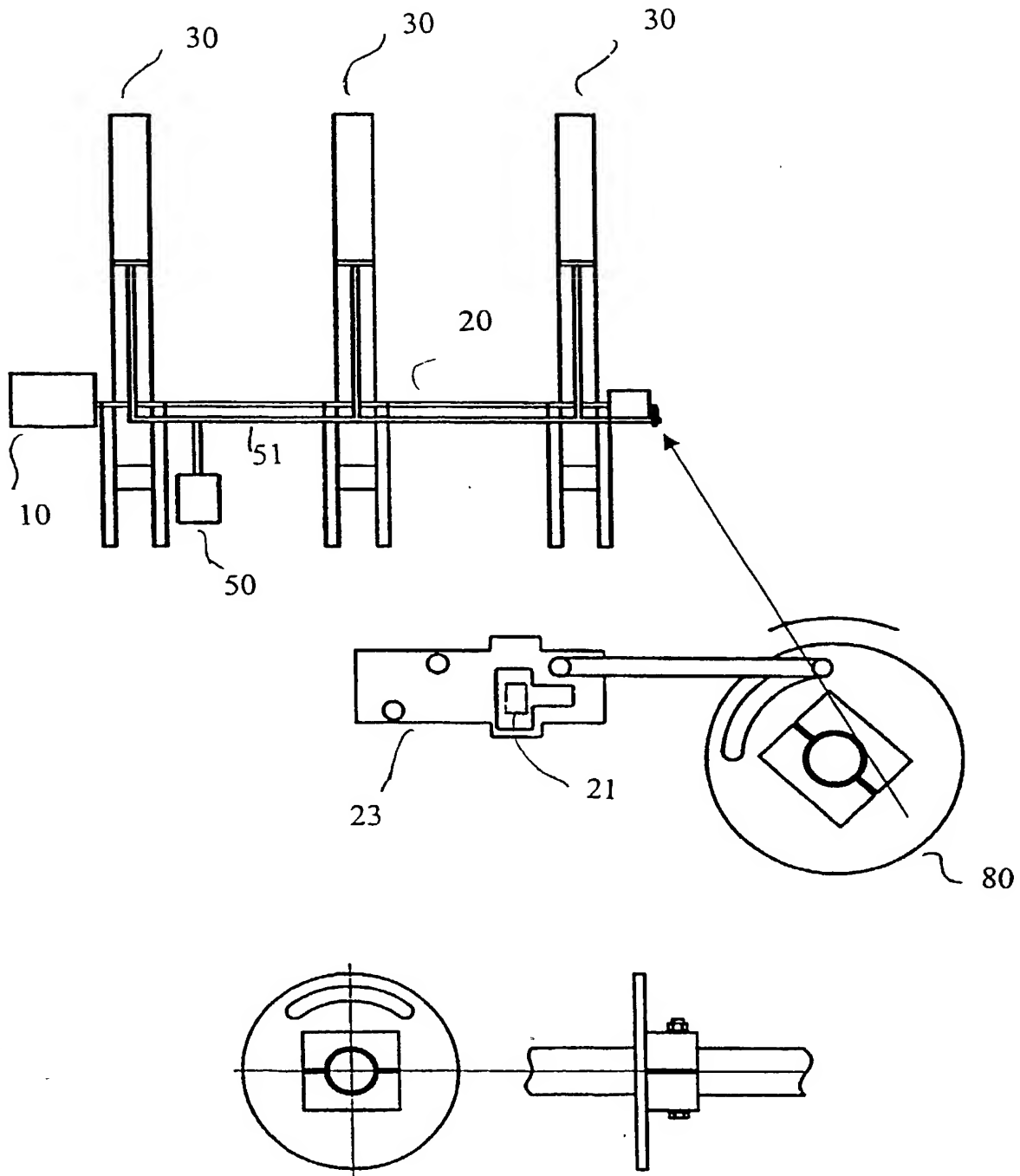


Fig. 6

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DECLARATIONS

RULE 63 (37 C.F.R. 1.63)
DECLARATION AND POWER OF ATTORNEY
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FORM

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name, and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the INVENTION ENTITLED
METHOD AND DEVICE FOR INTERLOCKING

the specification of which (CHECK applicable BOX(ES))

X A. ☐ is attached hereto.

BOX(ES) → B. ☒ was filed on March 11, 2002 as U.S. Application No. /

→ C. ☒ was filed as PCT International Application No. PCT/ SE00/01754 on September 8, 2000

and (if applicable to U.S. or PCT application) was amended on

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56. Except as noted below, I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International Application which designated at least one other country than the United States, listed below and have also identified below any foreign application for patent or inventor's certificate, or PCT International Application, filed by me or my assignee disclosing the subject matter claimed in this application and having a filing date (1) before that of the application on which priority is claimed, or (2) if no priority claimed, before the filing date of this application.

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Day/MONTH/Year Filed
10 September 1999

Date first Laid-
open or Published

Date Patented
or Granted

Priority NOT Claimed

If more prior foreign applications, X box at bottom and continue on attached page.

Except as noted below, I hereby claim domestic priority benefit under 35 U.S.C. 119(e) or 120 and/or 365(c) of the indicated United States applications listed below and PCT international applications listed above or below and, if this is a continuation-in-part (CIP) application, insofar as the subject matter disclosed and claimed in this application is in addition to that disclosed in such prior applications, I acknowledge the duty to disclose all information known to me to be material to patentability as defined in 37 C.F.R. 1.56 which became available between the filing date of each such prior application and the national or PCT international filing date of this application.

PRIOR U.S. PROVISIONAL, NONPROVISIONAL AND/OR PCT APPLICATION(S)

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Day/MONTH/Year Filed

Status
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Priority NOT Claimed

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

And I hereby appoint Pillsbury Winthrop LLP, Intellectual Property Group, telephone number (703) 905-2000 (to whom all communications are to be directed), and persons of that firm who are associated with USPTO Customer No. 909 (see below label) individually and collectively my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith and with the resulting patent, and I hereby authorize them to delete from that Customer No. names of persons no longer with their firm, to add new persons of their Firm to that Customer No., and to act and rely on instructions from and communicate directly with the person/assignee/attorney/firm/ organization who/which first sends/sent this case to them and by whom/which I hereby declare that I have consented after full disclosure to be represented unless/until I instruct the above Firm and/or an attorney of that Firm in writing to the contrary.

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00909

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☐ FOR ADDITIONAL INVENTORS see attached page.

☐ See additional foreign priorities on attached page (incorporated herein by reference).

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